

# The seedling of *Cassytha glabella* R.Br.

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## Summary

Clifford, H. Trevor (1999). The seedling of *Cassytha glabella* R.Br. *Austrobaileya* 5(2) 345–347. *Cassytha glabella* R.Br. is described with special reference to the cotyledons. Seedlings are cryptocotylar and seed germination is epigeal with the remains of the diaspore covering the tip of the plumular shoot.

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## Introduction

The seedlings of *Cassytha glabella* are unusual in several respects which may help account for the inaccuracies in the published descriptions of those of *C. melantha* R.Br. (Ewart 1919, 1930) and *C. paniculata* R.Br. (McLuckie & McKee, as *C. pubescens* R.Br. 1954). As with those of other species of Lauraceae, the seedlings are cryptocotylar but differ from them in that the remains of the diaspore with its enclosed seed remnants is usually retained on the stem apex of the young seedling rather than being attached laterally to the shoot.

Such epigeal behaviour is characteristic of many cryptocotylar species and was first described by Müller (1887) for *Myristica bicuhyba* which he encountered in Brazil. Furthermore, the cotyledons of *Cassytha* like those of many other durian-type seedlings, as they are often known, separate from the axis at an early stage of seedling growth (Ng 1978). The young shoot, with its apex capped by the remains of the diaspore superficially resembles a young seedling of *Allium* but the presence of scale leaves on the apparent cotyledon confirms that it is a stem. Careful inspection of the stem also reveals the presence of a pair of opposite scars some distance below the first scale-leaf. These scars mark the position of the cotyledonary node.

## Fruit and Seed

The diaspore is a superior drupe, embedded in but free from, a fleshy hypanthium which

derives from the post anthesis expansion of the floral receptacle. There is only one seed in each drupe and this develops from a solitary pendulous ovule (Sastri 1962). The embryo has a very short axis and two massive, tightly appressed plano-convex, peltate (Figs 1C, 1D), pale-green cotyledons. As with other laurals the mature seed lacks endosperm (Cronquist 1981).

## Seedling

The initial stages of germination are marked by a slight rupturing of the fruit wall followed by the emergence and growth of the hypocotyl to a length of several centimetres with little concomitant growth of the radicle. From the base of the hypocotyl, which is somewhat swollen, there develop several adventitious roots which anchor the plant in the soil (Figs 1A, 1B). Once the seedling has become established the plumule expands and after a few months the roots decay, at which time if the seedling has not formed haustoria on a suitable host it dies.

Extension of the plumular bud does not result in its escape from the seed. Instead, as the lowermost internodes of the shoot elongate, its apex remains enclosed between the cotyledons which are themselves retained within the remnants of the diaspore.

Due to the abscission of the very narrow cotyledon petioles at the site of their attachment to the stem, the remnants of the diaspore are often carried aloft on the tip of the shoot (Fig. 1B).

The position of the cotyledonary node on the axis is indicated by the pair of scars which mark the junction of the hypocotyl and epicotyl (Figs 1C, 1D).

Rarely, the diaspore wall ruptures extensively in which circumstance its remnants may be shed thereby exposing one or both cotyledons still attached to the seedling (Figs 1A, 1C, 1D).

### Discussion

The failure of Ewart (1919, 1930) to interpret correctly the structure of *Cassythia melantha* R.Br. seedlings is difficult to understand because Bentham (1870), with whose work he

was quite familiar, gave an excellent description of the embryo.

Furthermore, Bentham summarised the earlier literature in which the seed of this species was initially described as endospermic but later recognised to be non-endospermic with massive fleshy cotyledons. In his description of the family Brown (1810) not only referred to the cotyledons as large and plano-convex but noted that they were peltate, and stressed that his description was the result of direct observation.

It may be that Ewart (1919) was led into the error of assuming the seed was endospermic because he expected that since *Cassythia* was a

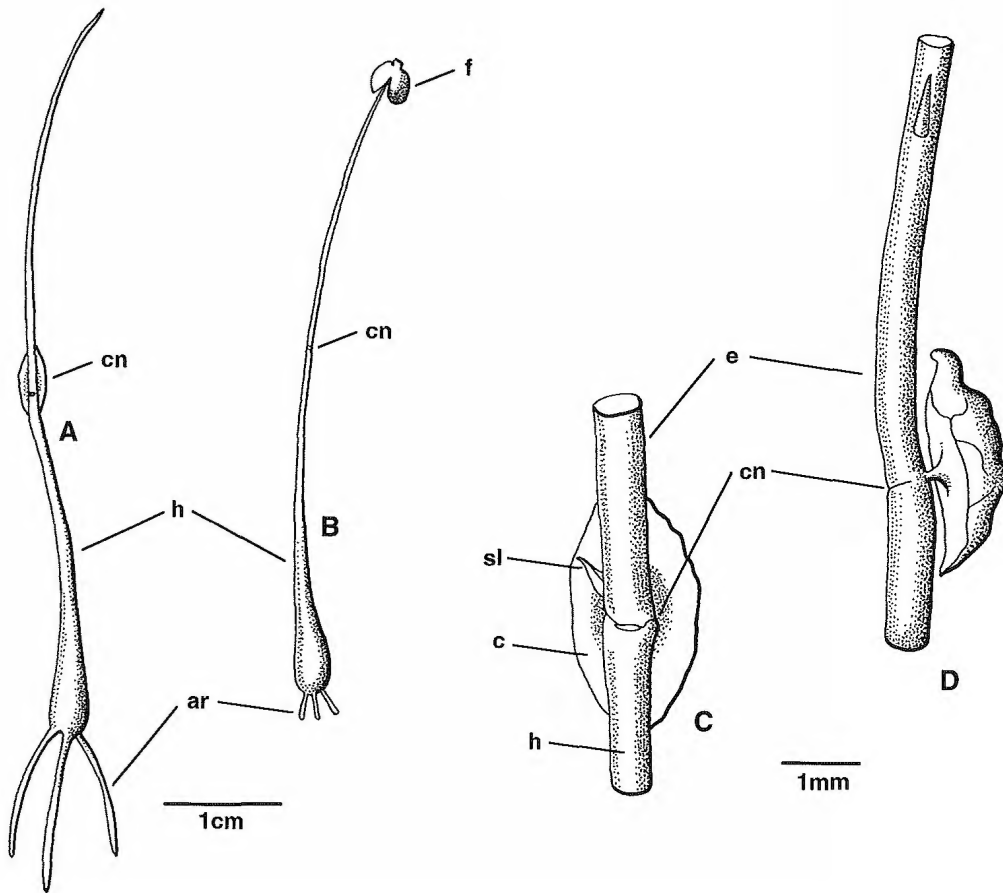


Fig. 1. Seedlings of *Cassythia glabella* A & B. Habit sketches; C & D. Details of cotyledonary node. ar, adventitious root; sl, scale-leaf; c, cotyledon; cn, cotyledonary node; f, remains of diaspore; e, epicotyl; h, hypocotyl.

twining leafless parasite, its embryo like, those of many other parasitic groups would lack cotyledons (Cronquist 1981). However, this explanation does not absolve him from failing to notice the scars marking the position of the cotyledonary node on the seedling axis. Furthermore, his assertion that the 'endosperm' is absorbed by the stem tip is not supported by his illustration in which there is no indication that digestion has occurred even though the seedling is well developed.

Ewart's description was soon challenged by Hart (1925) who recognised the presence of cotyledons in *Cassytha* seeds and suggested that the pair of opposite scars below the first scale leaf 'may be the original points of attachment of the cotyledons'. In a later paper (Hart 1946) he returned to the subject of the morphology of *Cassytha* seedlings but did little more than confirm his original observations.

The scars marking the cotyledonary node were overlooked by McLuckie and McKee (1954) who failed to record them on their otherwise excellent drawings of the seedlings of *Cassytha pubescens*. Such an oversight by two such otherwise careful observers is difficult to understand especially as they went on to follow Ewart (l.c.) and described the embryo of the species as acotyledonous.

The cotyledon scars were correctly recognised by Clifford (1987) but as did Kostermans (1957) and Weber (1981) he referred to the remnants of the diaspore covering the plumular axis as a seed. All three writers thereby lapsed into the common rather than the technical usage of the term.

The seedlings of all three *Cassytha* species studied are similar and differ in only minor respects from those of other Lauraceae. Seedling morphology therefore supports the view of Sastri (1962), based largely on embryology, that there is no justification for segregating the genus into a separate family as proposed by Bartling (in Lindley 1833) or subfamily as proposed by Kostermans (1957).

## References

- BENTHAM, G. (1870). *Flora Australiensis* 5:308-9. London: Lovell Reeve & Co.
- BROWN, R. (1810). *Prodromus Florae Novae Hollandiae et Insulae van Diemen*. London: Johnson & Co.
- CLIFFORD, H.T. (1987). Identification of seedlings in the Australian Flora. In P.Langkamp (ed.), *Germination of Australian Native Plant Seed*. Melbourne: Inkata Press. xii, 236 pp.
- CRONQUIST, A. (1981). *An Integrated System of Classification of Flowering Plants*. New York: Columbia University Press. xviii, 1262 pp.
- EWART, A.J. (1919). Contributions to the Flora of Australia, No.27. *Proceedings of the Royal Society of Victoria* 31(N.S.):367-78, Plate xviii.
- EWART, A.J. (1930). *Flora of Victoria*. Melbourne: University Press. 1257 pp.
- HART, T.S. (1925). The Victorian species of *Cassytha*. *Victorian Naturalist* 42:79-83.
- HART, T.S. (1946). Notes on the identification and growth of certain dodder-laurels. *Victorian Naturalist* 63:12-16.
- KOSTERMANS, A.J.G.H. (1957). Lauraceae. *Reinwardtia* 4:193-280.
- LINDLEY, J. (1833). *Nixus plantarum*. Londini: Ridgway et filios. v, 28 pp.
- McLUCKIE, J. & McKEE, H.S. (1954). *Australian and New Zealand Botany*. Sydney: Horowitz Publications Inc. xx, 758 pp.
- MÜLLER, F. (1887). Keimung der Bicuiba. *Berichte der Deutschen Botanischen Gesellschaft* 5:468-72., Taf.23.
- NG, F.S.P. (1978). Strategies of establishment in Malayan forest trees. In P.B. Tomlinson and M.H. Zimmermann (eds), *Tropical trees as living systems*. Cambridge: Cambridge University Press.
- SASTRI, R.L.N. (1962). Studies in Lauraceae: 3, Embryology of *Cassytha*. *Botanical Gazette* 123:197-206.
- WEBER, J.Z. (1981). A taxonomic revision of *Cassytha* (Lauraceae) in Australia. *Journal of the Adelaide Botanic Garden* 3:187-262.